

1300.00 TRAFFIC NOISE [Revised 5/4/11]

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Section - 1300 TRAFFIC NOISE

Section 1310.00 – Introduction

Efforts to minimize or avoid traffic noise impacts should first be considered during District corridor/planning studies and again when feasibility studies are being processed for selection of Statewide Transportation Improvement Program (STIP) projects. The elimination of unreasonable alternatives as early as possible in the project development/planning process, especially those involving alternative corridors and major alignment changes, will substantially reduce the time and cost of National Environmental Policy Act (NEPA) studies at the project stage of environmental analysis.

A traffic noise analysis shall be completed for each alternative under detailed study in NEPA documents. However, when Tier I Environmental Impact Statements or other planning studies that will examine broad corridors have already been placed on the STIP, the appropriate scope and methodology of the noise analysis should be discussed with FHWA to examine the option of limiting detailed study to the preferred alternative (re: SAFETEA-LU Section 6002). Due to the long lead time to complete a traffic noise study, the need to determine when a noise study is necessary should be done early in the NEPA process.

The Federal Highway Administration (FHWA) has established Noise Abatement Criteria (NAC) guidelines (absolute noise impact) for several categories of land use activities. The NAC Categories are listed in Table 1 to 23 CFR 772.

In determining and abating traffic noise impacts, primary consideration is to be given to exterior areas. Abatement will usually be necessary only where frequent human use occurs and a lowered noise level would be of benefit.

The level of noise (defined as unwanted sound) near highways depends on six things:

- Traffic volume
- Speed of the traffic (relates to tire-pavement noise)
- Percentage of trucks in the flow of traffic (relates to engine & exhaust noise)
- Distance to the highway
- Intervening topography and structures
- Atmospheric conditions

Heavier traffic volumes, higher speeds, and a greater percentage of trucks generally

increase traffic noise. ITD has several strategies for controlling highway noise which can help supplement this Traffic Noise Policy, as noted below:

- Preserve existing buffer zones. Work with local jurisdictions to retain lands adjacent to highways in open space uses, promote the use of berms, and preserve beneficial topographic features along with the use of trees, shrubs, and other vegetation to soften the landscape.
- Support local jurisdictions in establishing principal routes for buses and trucks.
- Review local land use plans and advise local agencies to help achieve compatible development along highways.
- Identify potential noise impacts and mitigation measures early in the planning and design stages of highway improvements; and design projects to reduce or minimize traffic noise impacts to receptors. For instance, when adding lanes, designers can reduce traffic noise impacts by shifting the centerline toward the side with few or no receptors. Widening the road asymmetrically in this manner can also reduce the amount of ground disturbance and the number of Right-of-Way negotiations with adjacent property owners.

1310.01 Abbreviations and Acronyms

Abbreviations and acronyms used in this section are listed below. Others are found in the general list in the appendix.

- dBA** ---- A-weighted decibels
- DHV**--- Design Hour Volume (30th highest traffic volume in a given year)
- ESM** --- Environmental Section Manager
- FHWA** – Federal Highway Administration
- ITD** ----- Idaho Transportation Department
- Leq** ----- Equivalent sound level
- LHTAC** - Local Highway Technical Assistance Council
- LOS** --- Level-of-Service
- NAC** ---- Noise Abatement Criteria
- NEPA** -- National Environmental Policy Act
- ROW** --- Right-of-way
- STIP** ---- Statewide Transportation Improvement Program
- TNM**---- Traffic Noise Model

1310.02 Glossary, Terms & Criteria

Abatement – An action taken to reduce the impact of highway traffic noise.

Abatement Measures – Measures considered in a traffic noise impact report when a highway project will result in a noise impact. This includes the following required/optional measures:

- Required Considerations
 - Construction of noise barriers.
 - Acquisition of property rights for barrier construction purposes, and
 - Insulation of public use, nonprofit institutional structures.

- Optional Considerations
 - Traffic management,
 - Alteration of horizontal and vertical alignments,
 - Acquisition of real property to serve as a buffer zone (Local jurisdictions only),

‘Absolute’ Noise Impact – One of two criteria used to determine when a noise impact occurs. Under this criterion, a traffic noise impact occurs when the predicted noise level approaches or exceeds the FHWA NAC. A traffic noise impact may occur even if the future noise level is lower than the existing noise level.

Alpha Factor – Modeling term used to differentiate terrain attenuation characteristics. For example, decibel levels decrease 3 dB per doubling of distance over asphalt or concrete (‘hard’ alpha), and 4.5 dB per doubling of distance over plowed ground or ground thickly covered with vegetation (‘soft’ alpha).

Approach – Means one (1) dBA below the FHWA “Absolute” noise impact criterion.

Barrier Cost Planning Estimate – Determined by multiplying the length times the adjusted height of a proposed noise wall by \$24.25 per square foot regarding walls over a quarter mile long, or by \$29.00 per square foot for a proposed wall less than a quarter mile long. (The adjusted height of a noise wall means the height of the wall above roadway centerline, plus 4 feet. ITD estimates cost based on wall height above centerline which is the same height used in TNM, however the barriers are constructed at the R/W line which are normally about 4 feet lower. Cost estimates for shorter walls are higher because of fixed costs such as mobilization.) This square foot cost will be reanalyzed at a regular interval not to exceed 5 years. [Note: the adjusted height can be modified when deemed appropriate by ITD.]

In addition to the above cost estimate, premiums (i.e., an additional cost above the normal cost) are added if the adjusted height exceeds 16 feet, or the proposed wall is located within the clear zone of the roadway (e.g., commonly within 30 feet of the traveled way regarding arterials/freeways).

- Height premium = \$1.00 per foot over 16 feet (added because of additional foundation and reinforcing costs associated with wind loading on taller walls.)
- Clear Zone Premium = 10% of total cost (added because of additional costs to install concrete Jersey barrier type deflection for safety purposes.)

[Example, if the TNM model indicates that a 250 ft. long, 14 ft. high wall is required

to effectively abate the noise impact to several single family residences; then instead of using \$29.00 sq.ft., one would use \$32.00 sq.ft. for the cost estimate (i.e., adjusted height = 14ft. + 4 ft. = 18 ft. or 2 ft. above 16 ft.). In this case, the planning cost estimate for the proposed wall would be \$144,000 (250' x 18' x \$32.00); and if located in the clear zone, a 10% premium or \$14,400 would be added for impact load requirements (collisions), for a total Barrier Cost Planning Estimate of \$158,400.]

Benefited Receptor – A receptor that is projected to receive a noise reduction of 5 decibels (dBA), or more, as a result of proposed traffic noise mitigation measures. All benefited receptors should be included whether or not they were identified as impacted. Each unit in a multifamily building should be counted as a receptor in determining impacts.

Benefited Receptor Cost Limit– The dollar amount used to determine cost reasonableness of traffic noise abatement. This amount equals \$24,250 per benefited receptor. *This cost will be reanalyzed at a regular interval not to exceed 5 years.*

Common Noise Environment - A group of receptors within the same NAC activity category that are exposed to similar noise sources and levels; traffic volumes, traffic mix, and speed; and topographic features. Generally, common noise environments occur between two secondary noise sources, such as interchanges, intersections, or crossroads.

Cost Effectiveness – Determined by multiplying the total number of benefited receptors by \$24,250 and subtracting the estimated cost of constructing an effective noise wall. A positive remainder means the barrier is cost effective. *This cost will be reanalyzed at a regular interval not to exceed 5 years.*

dBA – The most generally used measure of the magnitude of traffic noise. The decibel (dB) or one-tenth of a Bel is a measure on a logarithmic scale which indicates the ratio between two sound powers. A ratio of 2 in power corresponds to a difference of 3 dB between the two sounds. The 'A'-weighting tends to de-emphasize lower-frequency sounds (e.g., below 1,000 Hertz) and higher frequency sounds (above 4 Kilohertz) in an effort to mimic human hearing.

Date of Public Knowledge – The date of approval of the Categorical Exclusion, Finding of No Significant Impact, or Record of Decision, as defined in 23 CFR 771. Federal participation in noise abatement measures will not be considered for lands that are not permitted by the date of public knowledge.

Design Goal - The optimum desired dBA noise reduction determined from calculating the difference between future build traffic noise levels with abatement, to future build traffic noise levels without abatement. The Idaho Transportation Department traffic noise reduction design goal is 7 dBA for the closest benefitted receptor to centerline. Only one receptor needs to achieve this 7 dBA goal.

Design Hourly Volume (DHV) – The traffic volume determined by ITD to normally represent the worst hourly traffic noise impacts on a regular basis in a given year. The

DHV is used for design purposes as well as to model ‘current’ and ‘design year’ traffic noise levels. These traffic volume estimates must be obtained from ITD District; exceptions may involve local roads.

Design Year – The future year used to estimate the probable traffic volume for which a highway is designed, usually 10 to 20 years from the beginning of construction.

Desirable – Means that a majority of benefited property owners (50% plus 1) or 75% of benefited renters want a proposed noise barrier. (Example, if the owner of a Mobile Home Court does not want a noise wall, then benefited renters would be polled to determine their view. If 75% or more wanted the wall, the wall would be considered desirable.) This is determined after analysis to determine where affected and potentially benefitted receptors are located. The process used to determine desirability is to be described and responses documented once abatement has been determined feasible, although individual responses need not be included in the noise study report.

Effective Noise Wall – Means a sound abatement structure that achieves a minimum 5 dBA highway traffic noise reduction at the majority of impacted receptors.

Existing Noise Levels – The worst noise hour resulting from the combination of natural and mechanical sources and human activity usually present in a particular area.

Feasible – Means an effective noise wall/berm can be constructed considering the following combination of acoustical and engineering factors in the evaluation of a traffic noise abatement measure:

- Topography & Drainage,
- Access to adjacent properties (e.g., driveways, sidewalks, cross Streets, ramps),
- Maintenance access to adjacent properties,
- Utilities,
- Noise barrier height,
- Safety and
- Maintenance of the abatement measure.

A noise abatement measure will not be implemented where it will create a hazard or violate design standards [Considerations such as recovery zone, snow accumulation and removal, sight distance, barrier rail, drainage, utility easements, etc. can often be resolved thru design modifications. The AASHTO Policy on Geometric Design of Highways and Streets (“the Green Book”) can be referenced for site design requirements.]

Impacted Receptor – A receptor that has a traffic noise impact.

Insertion Loss – The net change in noise level at a receiver location due to the installation of a barrier. For purposes of this document, the term may be used interchangeably with “attenuation” or “noise reduction”.

Leq – The equivalent steady-state sound level, expressed in decibels, which in a stated

period of time (e.g., design hour) contains the same acoustic energy as the time-varying sound level during the same period of time; with $Leq(h)$ being the hourly value of Leq .

L10 – The sound level that is exceeded 10 percent of the time (90th percentile) for the period under consideration, with $L_{10}(h)$ being the hourly value of L_{10} . Permission is required from ITD ESM for L_{10} use involving ITD documents.

Level of Service – A qualitative measure describing operational conditions within a traffic stream; generally described in terms of such factors as highway type, speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience, safety, and traffic volume.

Multi-family Dwelling – A residential structure containing more than one residence. Each residence in a multi-family dwelling shall be counted as one receptor when determining impacted and benefited receptors.

Noise Abatement Criteria (NAC) – Noise levels for various activities or land uses established by FHWA that are used to determine when an ‘Absolute’ noise impact occurs. NAC are not to be used as a design goal for a noise abatement measure.

Noise barrier – A physical obstruction that is constructed between the highway noise source and the noise sensitive receptor(s) that lowers the noise level, that includes noise walls, noise berms (earth or other material), and combination berm/wall systems.

Permitted – A definite commitment to develop land with an approved specific design of land use activities as evidenced by the issuance of a building permit.

Property Owner – An individual or group of individuals that holds title, deed, or other legal documentation of ownership of a property or residence.

Qualified Noise Consultant – Analyst trained and experienced in the use of TNM. This person must be listed on ITD Term Agreement.

Reasonable – Means that a feasible traffic noise barrier is appropriate to construct based on an evaluation of the following required and optional socio-economic and ecological factors:

Required (Note: Failure to meet any one of these required factors means that a noise barrier is not reasonable)

- Barrier Cost Effectiveness (ie., \$24,250 per benefited receptor).
- Viewpoints of benefited property owners and residents of the benefited receptors (i.e., 50% +1 of benefited property owners or 75% of benefited renters must approve a noise barrier). [Example, if the owner of a Mobile Home Court does not want a noise wall, then benefited renters would be polled to determine their view. If 75% or more wanted the wall, the wall would be considered desirable. Desirability may be determined at a public hearing, by petition, by mailed questionnaires/surveys, or as otherwise determined acceptable by FHWA and

ITD].

- Design goal (i.e., 7 dBA re: closest receptor to centerline).

Optional (No single optional reasonable factor shall be used to determine that a noise abatement measure is unreasonable. The assessment results of the 7 factors below are used to increase the cost per benefited receptor. See Exhibit 10 for more details)

- Date of development (pre-dates highway, 1976 noise criteria)
- Changes between existing and build (design year) conditions
- Exposure to higher absolute traffic noise levels
- Design year build dBA levels compared to current & design year no-build.
- Compatibility with local land use plans.
- Local jurisdictional commitments to traffic noise abatement:
 - Land Use Plans & Policies (re: traffic noise & development)
 - Zoning (re: types of uses permitted adjacent to arterials)
 - Subdivision Regulations requirements (re: berms, setbacks)
 - Building Permits (re: noise insulation, type windows)
- Type of development to be protected (i.e., sensitive/noise tolerant)

Receiver – Alternative to the term ‘receptor’.

Receptor – A discrete or representative location of a noise sensitive area(s), for any of the land uses listed in the NAC activity categories. This includes residences, businesses and outdoor areas where highway traffic noise may affect frequent human activities. The closest corner of a receptor to highway centerline is to be used as the receptor location in modeling traffic noise impacts and attenuation projections. (Each direction of travel should be modeled as a separate roadway on divided highways). Sound level meter measurements should not be located closer than 10 feet from a building. Therefore, when taking field measurements at receptor sites involving buildings, the meter should be located at least 10 feet from the closest corner and at an equal distance to the highway. Under most situations, a single structure is considered a single receptor. Structures that contain multiple residential units (apartments, condominiums and duplexes) are considered to have one receptor per residential unit. For outdoor noise sensitive land uses, within Activity Categories C, D and E, the number of receptors will be determined by dividing the frontage of the land use by the average lot frontage of residences in the study area.

Relative Noise Impact – Alternative to the term ‘Substantial Noise Increase’. One of two criteria used to determine when a traffic noise impact occurs.

Residence – A dwelling unit. This includes either a single family residence or each dwelling unit in a multi-family dwelling.

Residential - Alternative to the term ‘multi-family dwelling or residence’.

Shielding factor – Any constructed or natural barrier located between the roadway and

receptor which provides a reduction in roadway traffic noise at the receptor site.

Statement of Likelihood – A statement provided in the environmental clearance document based on the feasibility and reasonableness analysis completed at the time the environmental document is being approved.

For example:

Based on the studies so far accomplished, the State/local jurisdiction intends to install noise abatement measures in the form of a barrier for the following receptors _____. These preliminary indications of likely abatement measures are based upon preliminary design for a barrier cost of \$_____ that will reduce the noise level by _____dBA for _____ residents. However, if during final design these conditions have subsequently changed, the abatement measures might not be provided. A final decision of the installation of the abatement measure(s) will be made upon completion of the project design and the public involvement processes. And/or:

Based on the studies so far accomplished, the State does not intend to install noise abatement measures for the following receptors _____ because (mark only applicable reasons):

- Abatement measures are not feasible
- Abatement measures do not meet the design goal
- Cost per benefited residence is excessive
- Abatement measures are not desired

However, if it subsequently develops during final design that project changes have occurred affecting these receptors a reevaluation of these considerations will be made. Also, additional project specific information may be added to explain the basis of the analysis and anticipated outcome.

Substantial Construction – The granting of a building permit, prior to ROW acquisition or construction approval for the highway.

Substantial Noise Increase – Under this criterion, a noise impact occurs when the project design year traffic noise level exceeds the existing noise level by 15 dBA or more; even if it does not approach or exceed the ‘Absolute’ noise abatement criteria.

Ten-point Transect – A line perpendicular to the highway upon which noise receptor locations are modeled at 50ft, 75ft, 100ft, 125ft, 150ft, 200ft, 250ft, 300ft, 400ft, and 800ft from centerline of an undivided highway or directional centerline in the case of a divided highway. This transect data will be provided to local officials in an effort to prevent future traffic noise impacts on currently undeveloped lands in conformance with 23 CFR 772.17. This transect data is also useful in determining the distance to model receptor locations on developed sites regarding traffic noise impact analysis.

Third-Party Funding - Funding by a source other than FHWA or ITD which is acceptable to make functional enhancements, such as absorptive treatment or aesthetic

improvements, to a traffic noise abatement measure already determined feasible and reasonable. It is prohibited to use third-party funding for a Federal or Federal-aid Type I or II project if the traffic noise abatement measure would require the additional funding from the third party to be considered feasible and/or reasonable.

Traffic Noise Impacts – Design Year build condition noise levels that approach or exceed the NAC; or create a substantial noise increase in the design year over existing conditions.

Trucks – Heavy trucks have 3-axles or more, medium trucks have 2-axles and 6-wheels.

Type I Project – A proposed federal-aid highway/multimodal project or one that requires FHWA approval which involves any of the following:

- The construction of a highway on new location;
- The physical alteration of an existing highway where there is substantial change to the horizontal or vertical alignment (i.e., A project that halves the horizontal distance between the traffic noise source and the closest receptor between the existing condition to the future build condition, or removes shielding by altering the vertical alignment or the topography therefore exposing the line-of-sight between the receptor and the traffic noise source);
- The addition of a through-traffic lane (This includes the addition of a through-traffic lane that functions as a HOV lane, High-Occupancy Toll lane, bus lane, or truck climbing lane);
- The addition of an auxiliary lane (Except for when the auxiliary lane is a turn lane);
- The addition or relocation of interchange lanes or ramps added to a quadrant to complete an existing partial Interchange;
- Restriping existing pavement for the purpose of adding a through-traffic lane or auxiliary lane;
- The addition of a new or substantial alteration of a weigh station, rest stop, ride-share lot or toll plaza;

Note that if a project is determined to be a Type I project under this definition then the entire project area as defined in the environmental document is a Type I project.

Type II or Retrofit Project – A stand alone federal-aid project (retrofit project) for noise abatement on an existing highway. For a Type II project to be eligible for Federal-aid funding, the highway agency must develop and implement a priority program in accordance with 23 CFR 772.7(e). The State does not program Type II projects.

Type III Project – A Federal or Federal-aid highway project that does not meet the classifications of a Type I or Type II project. Type III projects do not require a traffic noise analysis.

1320.00 - Applicable Statutes and Regulations

National Environmental Policy Act: <http://www.fhwa.dot.gov/environment/nepatxt.htm>

Council on Environmental Quality: 40 CFR 1500-1508 Regulations for Implementing NEPA
http://ceq.hss.doe.gov/nepa/regs/ceq/toc_ceq.htm

FHWA Procedures for Abatement of Highway Traffic Noise and Construction Noise: 23 CFR 772
<http://www.fhwa.dot.gov/legsregs/directives/fapg/cfr0772.htm>

FHWA Environmental Impact and Related Procedures: 23 CFR 771
<http://www.dot.ca.gov/ser/vol1/sec1/ch1fedlaw/23CFR771.pdf>

Federal-Aid Highway Act of 1970 and FHWA Implementing Regulations:
<http://www.gpoaccess.gov/cfr/index.html>

FHWA Technical Advisory T6640.8A
<http://environment.fhwa.dot.gov/projdev/impTA6640.asp>

FHWA Highway Traffic Noise: Analysis & Abatement Guidance, and Guidance on Construction Noise (Revised January 2011)
<http://www.fhwa.dot.gov/environment/noise/>

1330.00 - Technical Guidance

Guidance for conducting traffic noise studies and preparing documentation is provided in the material described in this section. The purpose of this guidance is to determine if the proposed project is a Type I project, and if so, will it create noise impacts, and the likelihood of providing abatement measures when appropriate. In addition, to lessen the likelihood of future noise impacts, local officials are to be provided appropriate information for their land-use planning and implementation efforts. The Idaho Transportation Department does not program or analyze Type II projects and Type III projects do not require traffic noise analysis by the State of Idaho.

1330.01 Information for Local Officials

- District/LHTAC environmental staff will provide the local jurisdiction with an estimation of future noise levels (for various distances from the highway improvement) for both developed and undeveloped lands and properties in the immediate vicinity of the project. (See Exhibit 1300-1)
- District/LHTAC staff will also provide information that may be useful to local communities to protect future land development from becoming incompatible with anticipated highway noise levels. Local officials responsible for issuing building permits or approving plat requests for future development adjacent to the

project should be encouraged to include a statement on the permits/plats indicating that the developer will be responsible for either avoiding traffic noise impacts or providing any associated abatement.

- District/LHTAC staff will provide local officials with information regarding eligibility for Federal-aid participation for Type II projects as described in 23 CFR 772.7(e). ITD does not program Type II projects. (Refer to Section 1330.06 for further information on Type II projects).
- In addition, local officials are to be reminded that after the date of public knowledge, ITD & FHWA are not responsible for noise abatement in the project area.
- Notification shall be sent to local officials by the District/LHTAC upon the completion of the environmental process, but no later than two weeks after approval date of the CE, FONSI, or ROD for Type I projects. Districts/LHTAC shall also provide a copy of this notification of local agencies to ITD Headquarters Environmental Section for tracking purposes.

Exhibit 1300-1 and **Exhibit 1300-2** display the recommended format and sample cover letter when providing information to local officials. This information will be sent by the District or LHTAC to the Mayor/City Manager or Chairman of the Board of County Commissioners with copies, as applicable, to:

- Chairman of the Planning Commission
- Director of the Planning and Zoning Dept.
- City/County Engineer
- Chief Building Inspector
- HQ Environmental Manager

1330.02 Traffic Noise Screening Process

Under the revised 23 CFR 772 traffic noise regulation, use of the ‘TNM Look’ program is no longer allowed for screening or other analysis. When traffic noise screening is needed or desired for a project, District/LHTAC environmental staff will either retain a qualified consultant or request screening be done by HQ Environmental Section and provide the required traffic and receptor information. The screening will be performed using the current FHWA approved TNM model to estimate the design year traffic noise level at selected distances from the roadway centerline and the potential for traffic noise impacts on adjacent landowners. This procedure involves a ‘ten-point transect’ and an examination of the closest receptor to centerline. Model inputs are to be based on design year/design hour volumes (DHV) at posted speeds, a hard alpha over flat terrain and no shielding effects. If the closest receptor to centerline is a Category E, then the closest Category B or C receptor within 400 feet of the roadway shall also be examined. (Category A and D receptors will be referred to FHWA for resolution).

If no traffic noise impacts are identified in the screening process, model printouts will be provided to the District/LHTAC for inclusion in their environmental submittal package and for compliance with regulating requirements involving local jurisdictions as noted in

Section 1330.01.

If potential impacts are identified, ITD Environmental Staff or a qualified consultant will perform on-site calibration procedures and screen the closest receptor to centerline (re: each applicable NAC Activity Category) for design year traffic noise impacts again using an approved version of TNM. If the closest receptor(s), as applicable, to the roadway (including undeveloped lands where development is permitted) does not exceed 65 dBA for Activity Categories B/C, or 70 dBA for Activity Category E, no further noise analysis is necessary except when Activity Categories A or D are involved. FHWA consultation is required regarding Activity Category A screening and analysis; the traffic noise analyst should be able to identify interior locations that require monitoring during preliminary field work.

If the screening process indicates that the project involves unresolved traffic noise impacts, then continue to Section 1330.03. Typically, Section 1330.03 will involve the services of a qualified traffic noise consultant.

1330.03 Traffic Noise Impact Analysis

The outline below serves as a general guide for preparing a traffic noise analysis report. The current approved version of TNM is the required analysis method. The report may contain information regarding sound, decibel levels, the causes of traffic noise and other background information deemed important by the District or consultant for public hearing or distribution purposes; but as a minimum must include:

- A Description of the Project and Affected Environment
 - A brief description of the project identifying it as a Type I.
 - Identify the local jurisdiction and their efforts/ordinances to promote compatibility between future land development and highways regarding noise abatement.
 - A description of the adjacent land use activities, undeveloped lands permitted for development and if the land use is changing.
 - Show applicable receptors, access locations, zoning on project area graphics.
- A Determination of Existing and Design Year Noise Levels and Impacts
 - Include a Table displaying existing and design year noise levels, which includes posted speeds and distance to centerline for receptor locations (no-build & build). Report decibel values and highlight dBA levels which approach or exceed noise abatement criteria in bold print. A sample table is presented in **Exhibit 1300-3**. Formatting the table in this manner is recommended to facilitate application of the abatement checklists.

Notes:

1. Each direction of travel should be modeled as a separate centerline on divided roads.
2. Identify receptors by category & number. Also, for Tables it is

helpful to include the activity for the general public (e.g., C1 School).

3. Analysis, modeling, and field measurements result in dBA values to the 10th of a decimal. To avoid any confusion, these decimal values shall be reported as measured and depicted on modeling output tables.

4. Because design year traffic noise levels can only be determined by computer modeling, existing traffic noise levels shall also be determined by computer modeling to allow a direct comparison of noise levels obtained by the same methodology (except that receptors involving highways on new location shall determine current noise levels using field measurements at representative receptor locations).

- Field measurements using an ANSI Type I or II sound level meter are required to calibrate and validate the model. Representative sites, including the closest residence to the roadway, are to be selected for measurement. Each site selected shall include three 6-minute or two 10-minute traffic counts (cars, medium trucks & heavy trucks) concurrent with a sound level meter reading (Longer counts may be necessary for low volume roads).

Notes:

1. 10 minute traffic counts are easily converted to 60 minute counts for insertion into the FHWA model by multiplying the respective vehicle count by 6.

2. Additional traffic counts or sampling periods greater than 10 minutes may be required to ensure statistically reliable data, as determined by the traffic noise analyst's judgment and based on the traffic volumes of the roadway under study (i.e., lower volume roadways often require longer sampling periods, and time periods of an hour or longer could be required)].

3. Actual meter readings are to be compared with results from the FHWA model. Adjustments to variables within the model may be necessary to calibrate the model. To be validated, the model must be within 3 dBA of the applicable meter reading; unless it is documented that site conditions or noise from other sources has a noticeable affect on the field measurements. For example, it is best to take field measurements at those times when traffic is running close to the posted speed rather than during periods of congestion when slower speeds are evident, since the posted speed is assumed in the model for the design year, design hour traffic volume, as well as the current year design hour traffic volume.

- Field measurements are also used to determine influential noise sources in the project area. In cases where highway traffic is not the dominant source of noise, the dominant source must be identified and noise levels produced by

that source(s) displayed on the Table and factored into the analysis.

- Truck percentage ratio between medium and heavy trucks should be determined from observed traffic counts, if not otherwise available.

- Include graphics identifying receptor locations & type, right-of-way lines, centerlines, property access, crossroads, and any shielding & proposed barrier information. Receptors located on hilly terrain may require topographic contour lines and spot elevations, whereas this data can typically be ignored given relatively level terrain conditions. Graphics depicting impacted receptors at an appropriate scale are emphasized.

- Include a narrative identifying NAC criteria, receptors impacted & severity of impact [e.g., are impacts less than, equal to, or greater than the no-build scenario; are increases unnoticeable (< 3 dBA), slightly noticeable (3 to 5 dBA), noticeable (5 to 15 dBA), or substantial (15 dBA and greater).

- Examination and Evaluation of Traffic Noise Abatement Measures

- The Barrier Checklist (Exhibit 1300-5) serves as a general guide and should be used by the traffic noise analyst to assess noise abatement measures for those receptors determined to be impacted by traffic noise from the project. This checklist first considers feasibility of noise abatement. The noise analysis is ended for any impacted receptors found to be not feasible for abatement by the analyst.

- Voluntary non-barrier noise abatement considerations (**Exhibit 1300-4**):

- *Traffic management measures* such as speed restrictions and truck routes may be evaluated for mitigation of traffic noise in cases where such measures do not conflict with the intended use of the roadway or create unreasonable delay or hardship on the motoring public, and they do not create a safety or enforcement problem.

- ITD does not consider the purchase of *buffer zones* on undeveloped land as a reasonable expenditure of State highway funds because local jurisdictions have the regulatory power to achieve compatible development adjacent to highways.

- A depressed roadway can effectively mitigate much of the traffic noise to adjacent receptors. If a project needs additional fill material, a lower roadway grade (*vertical alignment change*) may be a cost effective method to provide fill material while reducing traffic noise, or to provide berm material for noise barrier purposes. *Horizontal alignment changes* may also be beneficial in reducing traffic noise impacts and may be considered.

- Noise *insulation* of public use, non-profit institutional structures and other Category D activities shall be considered for those cases dealing with interior traffic noise impacts created by the ITD project.

- When measures are deemed feasible, the analyst proceeds to considerations of reasonability on the checklist. Upon completion of both the feasible and reasonable sections of the checklist, it is turned over to the District decision makers to be used as a basis in determining whether or not feasible abatement measures are considered reasonable and proposed for implementation.
- The District will complete the Traffic Noise Abatement Decision document (**Exhibit 1300-6**) for each receptor or group of receptors impacted, using the above checklists for guidance. Completion of this checklist documents the Districts determination regarding whether or not to proceed with noise abatement for a particular receptor or group of receptors. If the environmental document is being prepared by a consultant, the District should provide them with their decision regarding receptor abatement including a Statement of Likelihood as applicable to each receptor or group of receptors.

Notes:

-The environmental document text should identify impacted receptors, “no solution” receptors for which abatement is not feasible or not reasonable and why, and

-Include the Statement of Likelihood noting receptors for which measures are feasible and reasonable and ‘likely’ to be incorporated into the project.

-The environmental document text should reference the Traffic Noise Analysis Report, and the Report should be included with other applicable reference materials when the Environmental Document is submitted for approval.

- Construction Noise Impacts
 - Construction noise should be addressed in a general manner with emphasis on the temporary nature of any adverse effects.
 - Common, easy to implement measures to minimize construction noise should be included in the plans and specifications for a highway project (e.g., work-hour limits, equipment muffler requirements, etc.). **Exhibit 1300-7** provides an example of how to address construction noise impacts for routine projects.
 - The calculation of noise levels for highway construction equipment is normally not required in a traffic noise analyses.
- Analysis Methodology
 - Traffic data used (volumes, mix, posted speed) and source,
 - Average pavement type must be used for prediction of noise levels,
 - Explain any alpha factor or other adjustments to the model (shielding, barrier cost assumptions, etc.),
 - Any other applicable assumptions, along with a statement explaining that the analysis conforms with 23 CFR 772.

- Supporting documents to the Traffic Noise Impact Report include:
 - Input & Output tables (current existing, design year existing, design year proposed),
 - Barrier Checklists worksheets,
 - Traffic data sheets, and
 - As appropriate;
 - Typical sections,
 - Photographs,
 - Bibliography/References,
 - Excerpts from local ordinances or land-use plans,
 - Construction noise/mitigation for non-routine circumstances (i.e., projects with unusually severe highway construction noise impacts).

A generalized flowchart summarizing the traffic noise screening and analysis process is shown in **Exhibit 1300-9**.

1330.04 Data Requirements

Before requesting a traffic noise impact report, the ITD project manager may consider reducing consultant costs by using state forces to compile relevant data that will be needed by the analyst. Such data can include:

- Plan sheets or Micro Station files for the project showing
 - Receptor locations (labeled as to type),
 - Current and proposed route centerlines & ROW lines,
 - Current zoning classifications,
 - Topography & spot elevations,
 - Scale & north arrow,
- Land use information and zoning maps and indicate whether or not the local jurisdiction anticipates any changes in the project area regarding zoning and land use, and note if they have any noise controls in effect which preclude landowners/developers from creating new noise sensitive land uses adjacent to the route.
- Typical sections of existing and proposed route.
- Current and design year traffic data , including traffic volumes (DHV) and truck % on project area roadways (this data is required for any crossroads that may impact receptor locations or interfere with abatement considerations and for each project section for which there is a change in posted speed or 25% change in traffic volume).
- Current and projected posted speeds on all roadway sections in the project area

- Any other important sources of noise in proximity to the project area (e.g., railroad, airport, industrial site, crusher operation, etc.). Give the location and approximate distance to the route in question.
- Special route characteristics (e.g., truck route, signing to prohibit trucks at certain times, one-way traffic, business route, etc.)
- Any other information deemed important to the noise analysis; this may include survey data, petitions, complaints, route history, when adjacent subdivisions were given final plat approval, when building permits were issued, any direct/indirect effects on historical sites, jurisdictional desires, etc.)

Note: **Exhibit 1300-8** is a sample Scope of Work that can be used as a guide in contracting with consultants for traffic noise impact studies.

1330.05 ITD Traffic Noise Analysis and Abatement Policy and Procedures

- ITD will provide constructive recommendations to local jurisdictions to avoid future traffic noise impacts when they are considering development permits adjacent to highways.
- ITD will consider noise barriers and may consider other abatement measures to alleviate traffic noise impacts adjacent to Type I projects, and implement any measures considered feasible and reasonable.
- ITD will consider residences and other sensitive land uses to be reasonable candidates for the construction of traffic noise walls. All abatement measures that are warranted, feasible and reasonable will be incorporated into the project specifications.
- Providing effective sound barrier protection above the first floor of a multi-story sensitive receptor is normally not considered reasonable. (Walls constructed tall enough to break the line of sight for upper story units are seldom acceptable to ground floor residents and the additional reinforcement and foundation improvements for wind loading result in significantly greater construction costs.) Exceptions involve multistory apartments constructed below highway centerline because of terrain conditions.
- Retail, office, and other commercial or industrial enterprises and their associated parking areas and other supporting facilities are typically located adjacent to highways at least in part because of their high visibility to passing traffic. In addition, they are highly dependent on transportation access. These types of uses/activities are typically noise tolerant and past experience has shown that they typically do not desire traffic noise abatement. In fact, with these type uses located adjacent to higher volume roads, they can provide some degree of noise buffer for residences and other sensitive uses located behind them and at greater distances from the roadway. None-the-less, these land uses will receive appropriate, proper analysis in accordance with Table I and 23 CFR 772.
- ITD advocates that local jurisdictions use their power to regulate land development in such a way that noise-sensitive land uses are either not allowed

adjacent to a high volume roadway, or that the developments are planned, designed, and constructed in such a way that traffic noise impacts are minimized.

- Noise barriers may not normally be feasible for dwellings with access directly onto the highway (i.e., for reasons of poor barrier performance and poor sight distance). Reconfiguring neighborhoods, including streets, houses and access to private property, to arrange noise walls would not normally be considered feasible; except in cases where moving a driveway access can benefit project design/purpose or, with the consent of the property owner, can be arranged in such a manner that an effective sound wall can be constructed without exceeding cost reasonableness criteria.
- Any traffic noise abatement measures noted in 23 CFR 772.15(c) may be considered; however, noise barriers must be considered along with insulation and right-of way acquisition when applicable.
- Traffic noise barrier costs include the cost of construction and ROW acquisition.
- Any interior noise measurements are to be taken with all windows doors and other openings closed.
- Trees and shrubs provide psychological benefits regarding traffic noise and may be provided for privacy or aesthetic purposes, but are not considered as a noise abatement measure, except as noted in the example below.
- Reasonable effort should be made to preserve natural vegetation whether or not noise abatement is proposed. Vegetation softens the landscape and dense stands of vegetation that already exist along a highway, for example, may provide a perceptible amount of noise reduction for some receptors and should be preserved when possible (e.g., vegetation 15 feet high by 100 feet deep and dense enough not to be seen through, provides a 5 dBA decrease in noise levels).
- Unless part of an FHWA-approved Quiet Pavement Pilot Program, use of quieter pavements is not an acceptable Federal-aid noise abatement measure for Federal projects.

1330.06 Type II (Stand Alone) Noise Abatement Projects.

ITD does not program Type II projects.

1330.07 Traffic Noise Barrier Information Database and Evaluation of Cost Effectiveness.

ITD will maintain a database (inventory) of noise barrier information, consisting of the following information for all projects involving constructed traffic noise abatement measures:

- Project Name, Number & Type (Type I, State funded, City/County funded)
- Barrier location (State, county, city, route)
- Barrier Type
- Material
- Construction date

- Barrier length (linear feet)
- Average barrier height
- Barrier area
- Overall cost of barrier
- Unit cost per square foot of noise wall
- Average insertion loss/noise reduction (per TNM model)
- NAC category protected
- Features (absorptive, reflective, surface texture)
- Foundation

Cost information derived from this database will be used to establish barrier cost planning estimates and cost effectiveness. Barrier cost planning estimate will be based on the average unit price of noise walls on representative recent projects. Initial values of the barrier cost planning estimate and the limit of cost-effectiveness have been established as identified in Section 1310.03. The inflation rate between March 2005 and July 2010 has been used to adjust the dollar amount for cost/benefited receptors and barrier costs.

Section 1340.00 – Permits and Approvals

Not used.

Section 1350.00 – Exhibits

Exhibit 1300-1	Information for Local Officials (Sample)
Exhibit 1300-2	Cover Letter re: Information to Local Officials (Sample)
Exhibit 1300-3	Table Displaying Receptor Information (Sample)
Exhibit 1300-4	Voluntary Non-Barrier Checklist
Exhibit 1300-5	Barrier Checklist
Exhibit 1300-6	Noise Abatement Decision Checklist
Exhibit 1300-7	Construction Noise Impacts, Example-Routine Projects
Exhibit 1300-8	Scope of Work (Sample)
Exhibit 1300-9	Generalized Traffic Noise Screening and Analysis Process
Exhibit 1300-10	Benefited Receptor Cost Limit Adjustment Table